

**Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554**

In the Matter of

Amendment of Section 15.255 of the
Commission's Rules

ET Docket No. 21-264

REPLY COMMENTS OF APPLE INC.

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I. INTRODUCTION AND SUMMARY

The record in this proceeding confirms that the 60 GHz band holds enormous promise for new unlicensed device features using innovative technologies. To support this innovation and the consumer benefits it will produce, we recommend that the Commission adopt rules that do not favor one type of unlicensed device over another. In order to maximize the value of the 60 GHz band, the Commission should continue to follow its longstanding policy of technological neutrality for Part 15 operations and implement a regulatory framework that (1) promotes reasonable and equitable spectrum access while (2) recognizing that individual unlicensed devices are not entitled to interference protection.

The record also confirms that the Commission should adopt flexible coexistence rules rather than a “one-size-fits-all” requirement that could stifle innovation. For example, the Commission could follow an approach similar to that proposed by the Wi-Fi Alliance, which would enable manufacturers to select from among multiple techniques—including duty cycle limits, channel selection, or contention-based protocols—to promote coexistence among unlicensed devices in a way that is best-suited to their devices’ intended uses. Most importantly, however, the Commission should not impose a prescriptive duty cycle mandate for all devices that would treat successive transmissions of less than two milliseconds as “on time.” The rationales for this mandate, intended to provide stringent regulatory non-interference guarantees for a subset of unlicensed devices, are inconsistent with the spectrum policies that have made Part 15 a resounding success and would unnecessarily block the use of many technologies.

II. THE COMMISSION’S 60 GHZ BAND RULES SHOULD PROMOTE FURTHER INNOVATION BY PART 15 COMMUNICATIONS AND RADAR DEVICES.

The Commission is correct in recognizing the “increased interest in use of the [60 GHz] band” along with an “accompanying breadth of potential applications” in a wide variety of areas.¹ Numerous filings in this proceeding demonstrate that 60 GHz Part 15 devices can provide substantial public interest benefits in the near future using field disturbance sensor (“FDS”) radar and/or communications technologies that are enabled by the 14 GHz of contiguous spectrum available for unlicensed use.² In order to maximize the benefits of the band to consumers,

¹ See *Amendment of Section 15.255 of the Commission’s Rules*, Notice of Proposed Rulemaking, FCC No. 21-83, ET Docket No. 21-264, ¶ 9 (rel. July 14, 2021) (“NPRM”).

² See Comments of Google LLC, ET Docket 21-264 (filed Sept. 20, 2021) (“Google Comments”); Comments of Infineon Technologies Americas Corp., ET Docket No. 21-264 (filed Sept. 20, 2021) (“Infineon Comments”); Comments of Wi-Fi Alliance, ET Docket No. 21-264 (filed Sept. 20, 2021) (“Wi-Fi Alliance Comments”); Comments of Facebook, Inc., Intel Corporation, and Qualcomm Incorporated, ET Docket No. 21-264 (filed Sept. 20, 2021) (“Facebook, Intel, and Qualcomm Comments”); Comments of Texas Instruments Incorporated, ET Docket No. 21-264 (filed Sept. 20, 2021) (“Texas Instruments Comments”); Comments of Rivieh, Inc., ET Docket No. 21-264 (filed Sept. 20, 2021) (“Rivieh Inc. Comments”); Comments of Valeo North America, Inc., ET Docket No. 21-264 (filed Sept. 20, 2021) (“Valeo Comments”); Comments of IEE Sensing, ET Docket No. 21-264 (filed Sept. 20, 2021) (“IEE Sensing Comments”); Comments of Acconeer AB, ET Docket No. 21-264 (filed Sept. 20, 2021) (“Acconeer AB Comments”); Comments of The Alliance for Automotive Innovation, ET Docket No. 21-264 (filed Sept. 20, 2021) (“AAI Comments”); Comments of Husqvarna AB, Docket No. 21-264 (filed Sept. 20, 2021) (“Husqvarna AB Comments”); Brief Comments of Inxpect SpA, ET Docket No. 21-264 (filed July 19, 2021) (“Inxpect Brief Comments”); Comments of Inxpect SpA, ET Docket No. 21-264 (filed Sept. 21, 2021) (“Inxpect Comments”); Comments of Amazon.com, Inc., ET Docket No. 21-264 (filed Sept. 20, 2021) (“Amazon Comments”); Comments of Robert Bosch LLC, ET Docket No. 21-264 (filed Sept. 20, 2021) (“Bosch Comments”); Comments of ADC Automotive Distance Control Systems GMBH, ET Docket No. 21-264 (filed Sept. 20, 2021) (“ADC Comments”); Comments of Axis Communications AB, ET Docket No. 21-264 (filed Sept. 10, 2021) (“Axis Comments”); Comments of Vayyar Imaging Ltd., ET Docket No. 21-264 (filed Sept. 20, 2021) (“Vayyar Comments”); Comments of NEXTY Electronics Corporation, ET Docket No. 21-264 (filed Sept. 18, 2021) (“Nexty Comments”).

updates to the 60 GHz band rules should reflect the Commission’s longstanding policy of establishing technologically neutral rules that provide a framework for reasonable coexistence while recognizing that individual unlicensed devices are not entitled to interference protections.

A. The Record Demonstrates Widespread Interest in This Band for a Diverse Set of Novel and Important Wireless Applications.

The 60 GHz band holds enormous promise for innovative applications, in large part because it provides a unique block of contiguous spectrum for unlicensed use. For example, some parties intend to develop new user interface applications involving precise gesture controls,³ as well as enhancements to virtual and augmented reality applications using WiGig and other communications protocols⁴ and/or radar-based technologies.⁵ Several other filers have highlighted important health and safety benefits, including patient monitoring and fall detection,⁶ passenger occupancy determination to avoid “hot car” deaths where children or pets might be inadvertently left behind,⁷ and other transportation uses such as seat belt detection, object detection outside the vehicle, and traffic monitoring for smart cities.⁸

Commenters also cite communications applications that are either available or currently under development, such as multimedia streaming, wireless docking stations, real-time gaming,

³ See, e.g., Google Comments at 4-5; Infineon Comments at 2.

⁴ See, e.g., Wi-Fi Alliance Comments at 5; Facebook, Intel, and Qualcomm Comments at 4.

⁵ See, e.g., Infineon Comments at 2.

⁶ See e.g., Texas Instruments Comments at 3; Rivieh Inc. Comments at 1.

⁷ See, e.g., Valeo Comments at 3; IEE Sensing Comments at 2; Infineon Comments at 4. Acconeer AB Comments at 4.

⁸ See, e.g., Infineon Comments at 5; Acconeer AB Comments at 3,7; AAI Comments at 2; Texas Instruments Comments at 2.

gigabit backhaul, and other fixed deployments.⁹ And companies have identified other radar-based applications as well, including industrial and consumer robotics,¹⁰ security systems,¹¹ smart home devices,¹² and numerous other commercial uses that benefit from precision measurements.¹³ Rules that provide flexibility to enable a wide range of these applications—and innovations yet to come—will best serve the public interest.

B. Technology Neutral Policies Will Maximize the Utility of the Band.

As the Commission correctly observes, “the adoption of technology neutral rules has resulted in an explosion of innovation and the widespread adoption of unlicensed technologies by consumers and businesses.”¹⁴ But because the proponents of radar devices and communications devices have each cited this principle in support of their proposed—and often conflicting—operating rules,¹⁵ the Commission’s analysis should start by examining what technology neutrality means in the context of Part 15.

⁹ See, e.g., Wi-Fi Alliance Comments at 5-6; Facebook, Intel, Qualcomm Comments at 2, 5.

¹⁰ See, e.g., Husquvarna AB Comments at 1-2; Texas Instruments Comments at 2; Inxpect Brief Comments.

¹¹ See, e.g., Infineon Comments at 6; Texas Instruments Comments at 7; Axis Comments at 1.

¹² See, e.g., Acconeer AB at 4; Google at 1, 23.

¹³ See Acconeer AB at 8-10.

¹⁴ *Unlicensed Use of the 6 GHz Band*, Report & Order and Further Notice of Proposed Rulemaking, 35 FCC Rcd. 3852, ¶ 221 (2020) (“6 GHz Report and Order”).

¹⁵ Compare, e.g., Acconeer AB Comments at ii (“[T]he FCC must carefully consider the effect of its proposed rules and ensure that what it ultimately adopts is technically neutral and does not result in disparate operating conditions for some technologies.”), with Facebook, Intel, and Qualcomm Comments at 2 (“No application should get any preference over any other in this important unlicensed band.”).

The Commission’s unlicensed rules have been phenomenally successful because they established frameworks for the development of standards that promote “cooperative sharing of the spectrum by unlicensed devices while recognizing that such devices are not protected from interference.”¹⁶ Each of these factors is important: updates to the 60 GHz rules should provide a path forward so that the innovations described above “will be able to peacefully co-exist” in the band, but rules that are intended to support coexistence must not “effective[ly] reserve spectrum” for one technology by “preclud[ing] the provision of other services” on an unlicensed basis.¹⁷

This is because individual Part 15 devices must accept interference—including interference from other unlicensed devices—as a condition of their operation, and no Part 15 device “ha[s] any vested or recognizable right to the continued use of any given frequency....”¹⁸ Thus, although one Part 15 device may not *willfully* interfere with another Part 15 device’s operation,¹⁹ assertions that one Part 15 device’s operations must at all times protect another Part 15 device from “harmful interference” are incorrect.²⁰

The Commission should reject calls to implement requirements that would explicitly or implicitly change these longstanding rules. Indeed, the Commission has repeatedly decided not

¹⁶ See, e.g., Julius Knapp, *Industry makes Progress on Unlicensed LTE Coexistence*, Federal Communications Commission (2016) (last visited Oct. 18, 2021) <https://www.fcc.gov/news-events/blog/2016/09/23/industry-makes-progress-unlicensed-lte-coexistence>.

¹⁷ See *6 GHz Report and Order* ¶¶ 221-222.

¹⁸ 47 C.F.R. § 15.5(a)-(b).

¹⁹ See 47 U.S.C. § 333; *Marriott International, Inc., Marriott Hotel Services, Inc.*, Order/Consent Decree, 29 FCC Rcd 11760, ¶¶ 1-6 (2014).

²⁰ See, e.g., Facebook, Intel, and Qualcomm Comments at 21 (asserting that the Commission should “protect from harmful interference communications applications ... that will use this important unlicensed band”).

to establish rules that would serve as a *de facto* spectrum reservation for certain Part 15 technologies.

For example, the Commission rejected arguments that its 6 GHz U-NII rules must include “special protections for ultra-wideband and wideband devices,” noting that doing so “would effectively provide those devices with a level of interference protection to which they are not entitled.”²¹ Similarly, it declined a request by Qualcomm to require Part 15 rules to include “synchronized contention windows” that provide additional channel availability for coordinated operations by limiting non-synchronous access point continuous transmission time to 10 milliseconds, noting that imposing these additional restrictions on a subset of unlicensed devices would “advantage one type of specific unlicensed technology over ... others.”²²

The FCC has followed this principle even if adopting interference protections for a subset of Part 15 devices would serve important “civic, cultural, religious, ... and education” needs.²³ In the Commission’s wireless microphone proceeding, it declined “to permit unlicensed wireless microphone users to register their unlicensed operations for protection from other unlicensed operations...,” because “allowing these unlicensed users to obtain interference protection would be inconsistent with their unlicensed status.”²⁴ Instead, the Commission concluded that it would

²¹ 6 GHz Report and Order ¶ 219.

²² *Id.* ¶¶ 223-226 (quoting Reply Comments of Hewlett Packard Enterprise).

²³ *See Promoting Spectrum Access for Wireless Microphone Operations*, Order On Reconsideration and Further Notice of Proposed Rulemaking, 32 FCC Rcd. 6077, 6107 ¶ 56 (2017).

²⁴ *Id.*

be more appropriate to consider expanding opportunities for a subset of these users to operate wireless microphones on a licensed basis, including in different frequency bands.²⁵

The Commission should continue to follow these precedents, and adopt rules designed to promote equitable spectrum access rather than those that would create *de facto* spectrum reservations for some categories of unlicensed devices.

III. THE COMMISSION SHOULD IMPLEMENT FLEXIBLE COEXISTENCE REQUIREMENTS.

The Commission has appropriately sought comment on coexistence requirements that are consistent with its goal of “maximiz[ing] the efficiency of both communications and radar operations without unduly degrading the operating environment for unlicensed users of the band or causing harmful interference to authorized users in the band.”²⁶ In cases where the Commission concludes that coexistence requirements for higher power FDS and communications devices would serve the public interest, it should adopt rules that provide flexibility for industry to use multiple approaches. In particular, it should avoid requiring compliance with a single, prescriptive duty cycle mandate that was proposed in order to provide regulatory non-interference guarantees that are inappropriate for unlicensed operations.

A. The Record Reflects Widespread Support for Flexible Coexistence Measures.

The record includes substantial evidence that radar operations can successfully co-exist with unlicensed communications devices. For example, lab studies, modeling, and analysis submitted by several parties indicate that many representative short-range radar applications are

²⁵ *Id.* ¶ 90.

²⁶ *See* NPRM ¶ 32.

unlikely to negatively impact 802.11ad communications operations.²⁷ But some coexistence techniques could offer additional flexibility; for example, by enabling radar and communications devices to operate at the same 40 dBm power level.²⁸ To the extent that the Commission implements coexistence requirements, however, it should be extremely careful—stringent rules would be inconsistent with past Commission practice regarding unlicensed bands and run the risk of blocking one unlicensed technology to favor another—and certainly should not implement rigid or inflexible mandates for 60 GHz unlicensed devices.

Any one-size-fits-all coexistence rule for the wide range of potential unlicensed applications could undermine the band as a home for diverse, innovative technologies, and favor some applications over others.²⁹ Even within the same industry, commenters have cited differing

²⁷ See, e.g., Letter from Edward A. Yorkgitis, Jr., Counsel to Infineon, to Marlene H. Dortch, FCC Secretary, GN Docket No. 14-177, at 1-2 (filed Jun. 23, 2021) (reporting coexistence data and analysis of “60 GHz radars and WiGig devices in a variety of configurations”); Google Comments at 7-10 (coexistence studies of lab measurements and simulations determined that communications device degraded throughput “was small even in the worst-case scenarios (i.e., approximately 8% when assuming a 100% duty cycle for the radar), and negligible to non-existent in more realistic situations.”); Acconeer AB Comments at 21-23 (submitting modeling and interference measurement studies “show[ing] that the 802.11ad system should be robust to pulse radar (and similar) interference, and with realistic radar parameters, the influence on the 802.11ad system should be limited.”).

²⁸ See, e.g., Amazon Comments at 2 (FCC should implement “spectrum sensing coexistence measures for both radar and communications devices operating at power levels in excess of 20 dBm EIRP”); AAI Comments at 4 (group “would consider supporting the use of a contention-based protocol, such as listen-before-talk (“LBT”) for FDS devices to operate at 40 dBm EIRP across the 60 GHz band” if the Commission determines that it is necessary); Bosch Comments at 7 (supporting contention based protocol for “fixed outdoor infrastructure FDS devices [that] operate at 40 dBm across the 60 GHz band.”).

²⁹ See, e.g., Texas Instruments Comments at 1 (Commission should avoid “one-size-fits-all solutions that may unintentionally chill the deployment of beneficial and innovative radar applications.”).

performance considerations.³⁰ And as discussed below, the record indicates that a single prescriptive duty cycle mandate could effectively foreclose many innovative short-range applications.

Providing flexible rules is the best approach if the Commission determines that coexistence rules are necessary, as they will enable device manufacturers to select the parameters that are best suited to their applications. For example, a company developing a radar system could elect to implement a contention-based protocol to operate at the same transmit power as a communications device, or the device could promote coexistence by operating at a lower transmit power.³¹ Or there could be fewer restrictions for radar devices that operate within a subset of available 802.11ad WiGig channels.³²

This approach will help promote continued innovation in the 60 GHz band as applications, systems, and techniques evolve. Doing so will also better enable companies to design products that can be used in the numerous jurisdictions whose 60 GHz regulations are

³⁰ Compare, e.g., ADC Comments at 12 (“strongly recommend[ing] against” listen-before-talk requirements for in-cabin radars) with AAI Comments at 4 (group “would consider” use of contention based protocols in certain situations).

³¹ See, e.g., Google Comments at 18-19.

³² See, e.g., Texas Instruments Comments at 10-11. See also Google Comments at 18 (“[I]f the Commission deems that a duty cycle limit is absolutely necessary, such limit should apply only to radars that occupy a bandwidth greater than 4.5 GHz. A radar that has a bandwidth of less than 4.5 GHz can be aligned with two, 2.16 GHz-wide WiGig channels, leaving one WiGig channel completely free.”).

based on the ETSI EN 305 550 standard for short range device operations, which can lead to significant design and manufacturing efficiencies.³³

Significantly, the Wi-Fi Alliance—which oversees the 60 GHz WiGig certification program—itself agrees that a single rule intended to promote coexistence with Part 15 communications devices “may unnecessarily constrain operation of FDS devices.”³⁴ Thus, the Wi-Fi Alliance encourages the Commission to permit multiple coexistence approaches. Specifically, the Wi-Fi Alliance recommends that the Commission determine that an FDS device’s operation will promote coexistence with 60 GHz communications devices if it (a) transmits at a maximum EIRP of 13 dBm and adheres to a 10% duty cycle requirement in a 33 millisecond interval that treats successive radar pulses less than two milliseconds apart as “on time”;³⁵ (b) transmits at a maximum EIRP of 20 dBm and operates exclusively within the first two WiGig channels in the lower 4.5 GHz portion of the band;³⁶ or (c) transmits at a maximum EIRP of 20 dBm and implements an effective contention-based protocol.³⁷

This proposal is more restrictive than the operating parameters requested by many radar proponents, and includes a duty cycle option that, as discussed below, is incompatible with many use cases. But because it provides multiple options rather than a single mandate, Apple believes that this proposal represents a reasonable—if conservative—basis for initial rules that can

³³ See, e.g., Amazon Comments at 3, 9; Google comments at 15; Nexty Comments at 1; Bosch Comments at 6; Acconer AB Comments at 14; Valeo Comments at 6; IEE Sensing Comments at 10; Infineon Comments at 8.

³⁴ Wi-Fi Alliance Comments at 3.

³⁵ *Id.* at 9, 11.

³⁶ *Id.* at 12.

³⁷ *Id.* at 12-13.

achieve the Commission’s goal of promoting innovation in the 60 GHz band while providing for coexistence with communications devices and protecting incumbents.³⁸ As Wi-Fi Alliance observes, however, the Commission should be willing to re-assess these rules if “technologies with a different set of spectrum needs and coexistence challenges emerge....”³⁹

B. The Commission Should Avoid Prescriptive Duty Cycle Mandates.

To the extent that the Commission relies on a duty cycle requirement to promote coexistence, the record confirms that the rules should avoid a single, restrictive duty cycle mandate. As several commenters caution, duty cycle limits could constrain important radar use cases.⁴⁰ For example, parties have explained that higher duty cycles might be necessary to accommodate applications such as fall detection and patient monitoring, industrial safety applications, 3D imaging and object tracking, and operations at higher speeds.⁴¹ Moreover, multiple parties have proposed different duty cycle parameters depending on the bandwidth or transmit power of radar operations.⁴²

In particular, the record confirms that the Commission should not mandate the duty cycle provision requested by Facebook, Intel, and Qualcomm—which would treat successive

³⁸ See NPRM ¶ 14.

³⁹ Wi-Fi Alliance Comments at 13.

⁴⁰ See Amazon Comments at 8-10 (“FDS are unable to sense during the transmission-off period required by duty cycling,” limiting their functionality). See also ADC Comments at 9 (cautioning that a “10% duty cycle (based on a maximum 3.3 ms transmission time in every 33 ms interval)” would degrade performance); Valeo Comments at 7-8 (10% duty cycle is “too constraining for the targeted application cases of the automotive in-cabin radar.”).

⁴¹ See, e.g., Infineon Comments at 5-10; Rivieh Comments at 1; Inxpect Comments at 3-4; Bosch Comments at 6-7.

⁴² See, e.g., Axis Comments at 2; Texas Instruments Comments at 10; ADC Comments at 9-10; Rivieh Comments at 1; Inxpect Comments at 4.

transmissions separated by less than two milliseconds as “on time” for the purpose of calculating compliance—for all radar devices.⁴³ As numerous parties have cautioned, this request would significantly restrict the use of fundamental radar techniques on which several contemplated short-range applications would rely.⁴⁴ Thus, such a requirement would effectively foreclose the Commission’s goal of making the 60 GHz band a home for the next generation of innovative technologies.

We recommend that the Commission also reject the Facebook, Intel, and Qualcomm request because their rationale for this requirement is inconsistent with the principles that have made the Commission’s unlicensed rules a resounding success. First, Facebook, Intel, and Qualcomm argue that the Commission must implement their proposed duty cycle provision “to protect from harmful interference communications applications ... that will use this important unlicensed band.”⁴⁵ But this is incorrect as a matter of law. As discussed above, the Part 15 rules and Commission precedent make clear that, while Part 15 rules should provide a reasonable framework for sharing, individual devices may not assert protection from harmful interference. Indeed, this is the bargain at the very core of the FCC’s unlicensed rules: Part 15 provides numerous benefits, including technical flexibility, rapid deployment, no spectrum access fees,

⁴³ See *generally* Facebook, Intel, and Qualcomm comments.

⁴⁴ See, e.g., Texas Instruments Comments at 11; Google Comments at 17-18, 20-23; Amazon Comments at 9; Vayyar Comments at 6; Husqvarna Comments at 2; Inspect Comments at 3-4; Axis Comments at 1-2.

⁴⁵ Facebook, Intel, and Qualcomm Comments at 21.

and freedom from other burdens and delays “inherent in the licensing process,” but does so “in exchange for operating on an interference sufferance basis....”⁴⁶

Facebook, Intel, and Qualcomm assert that their proposed restriction is necessary for their preferred 60 GHz unlicensed applications “to provide an acceptable Quality of Service.”⁴⁷ More specifically, Facebook, Intel, and Qualcomm indicate that the proposed restriction was intended to ensure “[w]ireless link ... packet latency ... within a few milliseconds” for 99% of all packets.⁴⁸ But as other commenters have explained, applications that require a spectrum environment that provides QoS guarantees for virtually every packet are more appropriate for a licensed band than a shared band, where rules should promote reasonable coexistence among a wide range of devices that may not reserve channels for their exclusive use.⁴⁹

The Commission should also reject Facebook, Intel, and Qualcomm’s request because it has recognized that end users and facility owners can take actions to promote coexistence between two different Part 15 devices in close proximity. Facebook, Intel, and Qualcomm maintain that the requested duty cycle restriction is necessary to reduce the risk of interference when radar and communications devices are in “very close proximity,” e.g., “within one or two

⁴⁶ Kenneth Carter et al., *Unlicensed and Unshackled: A Joint OSP-OET White Paper on Unlicensed Devices and Their Regulatory Issues*, Federal Communications Commission (2003) at 5.

⁴⁷ Facebook, Intel, and Qualcomm Comments at 6.

⁴⁸ Letter from Facebook, Intel, and Qualcomm to Marlene Dortch, FCC Secretary, GN Docket No. 14-177, at Attachment slide 6 (filed May 10, 2021).

⁴⁹ See Google Comments at 20. See also IEE Sensing Comments at 7 (Facebook, Intel, and Qualcomm’s “desire for such a degree of protection is incompatible with the unlicensed character of this band...”).

meters.”⁵⁰ For example, their filing describes scenarios in which a user is in a living room with a radar device “on a nearby tabletop,”⁵¹ a user sits at a computer workstation with wearable communications and radar devices,⁵² and communications and radar devices operate inside the same vehicle.⁵³

But it has long been the FCC’s policy to take the proximity of unlicensed devices into account when assessing the likelihood of interference, and to establish rules that are “designed primarily to minimize interference problems in those situations where the interfering device and the victim receiver are not under common control.”⁵⁴ As the Commission has explained, this is because end users and facility owners are more likely to be able to “take appropriate steps in the event interference occurs,” such as moving a device to a different operating channel, increasing

⁵⁰ Facebook, Intel, and Qualcomm Comments at 3,7.

⁵¹ *Id.* at 6-7.

⁵² *Id.* at 8.

⁵³ *Id.* at 9.

⁵⁴ *See Amendment of the Rules Concerning RF Lighting Devices; Radiation Limits on Lighting Devices*, Report and Order, 2 FCC Rcd. 6775, ¶ 9 (1987). *See also, e.g., Amendment of the Rules Concerning RF Lighting Devices*, Memorandum Opinion and Order, 3 FCC Rcd. 6097, ¶ 17 (1988) (“[I]t would not be cost-effective to impose standards designed to protect a user from receiving interference from his own lighting devices.”); *Review of Part 15 and other Commission Rules*, Third Report and Order, 19 FCC Rcd. 7484, ¶ 23 (2004) (“Door opener controls used in close proximity to 433 MHz RFID devices would most likely be under the control of the party operating the RFID devices, who could take appropriate steps in the event interference occurs, including changing the frequency of a door opener control, if possible, or ceasing operation a device that causes interference.”); *6 GHz Report and Order* ¶ 222 (“[W]here devices are in close proximity, users will likely be able to promote co-existence by adjusting the positioning of UWB and RLAN devices. Thus, for ultra-wideband and wideband devices employed in industrial applications and other indoor locations, the facility owner will be able to exercise control over the use and placement of new unlicensed devices, and if necessary, can choose which devices to deploy to avoid unwanted interference.”).

physical separation distance, and/or simply refraining from simultaneous use of the devices.⁵⁵

Indeed, in this very band, the Commission has previously observed that 60 GHz point-to-point window links using indoor antennas can co-exist with wireless personal area network devices such as WiGig because, “[i]n most cases, both types of devices are under the control of the same party who could take steps to eliminate interference, *e.g.*, by moving one or both devices a short distance away from one another.”⁵⁶ The Commission should continue to include device proximity in its analysis when evaluating arguments that it must implement restrictive operating parameters on a subset of devices.

IV. CONCLUSION

Revisions to the 60 GHz rules can promote the Commission’s core goal: development of novel and important unlicensed applications that reasonably coexist with existing Part 15 devices and avoid harmful interference to authorized users. If the Commission’s rules are to be successful, however, they must be sufficiently flexible to support innovation and investment, and must avoid excessive regulatory approaches that would undermine the wide range of technologies that are on the horizon in order to provide special protections to a subset of unlicensed devices. Apple appreciates the opportunity to comment on this proceeding.

⁵⁵ *See id.*

⁵⁶ *Revision of Part 15 of the Commission’s Rules Regarding Operation in the 57-64 GHz Band*, Report and Order, 28 FCC Rcd. 12517, ¶ 17 (2013).

Respectfully submitted,

A handwritten signature in black ink, appearing to read "Paul Margie", is written over a horizontal line.

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